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Errata

Page 410, line 17 from bottom, for Pretz read Fretz.
Page 412, line 10, for Pretz read Fretz.
Page 418, lines 1 and 13 from bottom, for Pretz read Fretz.
Page 638, line 18, for *chryptandrus* read *cryptandrus*.

Vol. 42 No. 1

BULLETIN

OF THE

TORREY BOTANICAL CLUB

JANUARY, 1915

West Indian mosses—II. Mosses of the Danish West Indies and Virgin Islands

ELIZABETH GERTRUDE BRITTON

(WITH PLATE 1)

In February, 1913, Miss Delia W. Marble and I spent four weeks collecting on the island of St. Thomas, while Dr. Britton and Dr. Shafer cruised around among the other islands of the Archipelago in search of cacti and other plants. An account of their trip will be found in the Journal of the New York Botanical Garden.*

As far as we know, no record of any other collection of mosses from these islands exists, excepting the brief account given by Dr. I. Urban† of the collections made by the Rev. Johann Christian Breutel in 1841. Most of Breutel's mosses, 310 numbers, are deposited at the British Museum, but his collections included specimens from St. Thomas, St. Croix, St. Jan, St. Kitts, and Antigua, as well as the collections made in South Africa in 1853–1854. This would account for the large number of specimens preserved in his herbarium, as our experience has shown that the Danish and Virgin Islands are not particularly rich in species of bryophytes.

William Mitten had a few duplicates from Breutel's collections including the following six species: *Calymperes Richardi* C. Müll. (distributed as *C. Afzelii* Sw.), *Hymenostomum Breutelii* (C. Müll.) Broth., *Tortula agraria* (Sw.) Sw., *Philonotis tenella* (C.

* Jour. N. Y. Bot. Garden 14: 99. 1913.

† Symbolae Antill. 3: 28. 1902.

[The BULLETIN for December (41: 577–657. *pl. 21–23*) was issued Ja 8, 1915.

Müll.) Jaeg., *Stereophyllum leucostegum* (Brid.) Mitt. (distributed as *Hypnum Breutelii* Schimp.), and *Taxithelium planum* (Brid.) Mitt. (distributed as *Hypnum Antillarum* Schimp. ms.).

Baron von Eggers collected a few mosses in St. Thomas, St. Jan, and Tortola in 1887, but as far as we know no list of these has been published.

We collected about seventy packets, but found only twenty-eight species, representing twenty-two genera, though we added three new species, a small *Phascum*, a sterile *Hyophila*, and a sterile *Bryum*, which has since been found on Mona Island also.

A brief synonymy with localities and habitat of these species is given in the following enumeration: Nos. 1–4 and 7–9 were determined by Mr. R. S. Williams; Nos. 16 and 17 by M. G. Dismier. Unless otherwise noted the specimens cited were collected by Miss Marble and myself.

1. DICRANELLA LONGIROSTRIS (Schwaegr.) Mitt. Jour. Linn. Soc. Bot. **12**: 30. 1869

ST. JAN: without definite locality, *Breutel*, 1841.

2. LEUCOLOMA SERRULATUM Brid. Bryol. Univ. **2**: 752. 1827

Leucoloma Riedlei Besch. Jour. de Bot. **5**: 146. 1891.

ST. THOMAS: on trees in wet woods, *Riedlé*.

3. OCTOBLEPHARUM ALBIDUM (L.) Hedw. Descr. **3**: 15. 1791

ST. THOMAS: on roots of an *Anthurium*, stone walls, between Pearl and Bonne Resolution near Caret Bay, *1337*.

4. LEUCOBRYUM POLAKOWSKYI (C. Müll.) Cardot, Mém. Soc. Sci. Nat. Cherbourg **32**: 82. 1900

TORTOLA: on rotten wood, Sage Mt., *W. C. Fishlock 83*, May, 1913. Also in Porto Rico, *E. G. Britton 2518*, April, 1913.*

5. FISSIDENS KEGELIANUS C. Müll. Linnaea **21**: 181. 1848

ST. THOMAS and ST. JAN: at base of palms and on the ground, *Breutel*, 1841 (distributed as *F. palmatus* [Sw.] Hedw.). ST. JAN: wet bank, Bethania, *Britton & Shafer 208a*. ST. THOMAS:

* Both these are additions to ranges since the publication of Part 2, Vol. 15, of North American Flora.

moist banks near French wharf; Water Island, Cowell Point, *147;* St. Peter, *38, 98;* Magin's Bay, *191;* Smith's Bay, *1289, 1316, 1459.*

6. FISSIDENS ELEGANS Brid. Spec. Musc. 167. 1806

ST. JAN; on wet rock, Bethania, *Britton & Shafer 361.* ST. THOMAS: Cowell Point, *100.*

7. SYRRHOPODON FLAVESCENS C. Müll. Syn. 1: 541. 1849

ST. JAN: on rotten wood, Bordeaux, 300 m. alt., *Britton & Shafer 549.* TORTOLA: without definite locality, *W. C. Fishlock 82.* May, 1913.

8. CALYMPERES RICHARDI C. Müll. Syn. 1: 524. 1849

Calymperes Breutelii Besch. Ann. Sci. Nat. Bot. VIII. 1: 278. 1895.

Calymperes hexagonum Besch. l. c. 286.

Calymperes Hookeri Besch. l. c. 287.

ST. THOMAS: without definite locality, *Breutel* (type of *C. Breutelii*); without definite locality, *L. C. Richard* (type of *C. hexagonum*); on rocks, summit of ridge, by roadside, north of Charlotte Amalia, *408;* on bank, Cowell Point, *101.* TORTOLA: Roadtown to High Bush, 325 m. alt., *Britton & Shafer 772.*

9. CALYMPERES LONCHOPHYLLUM Schwaegr. Suppl. 1^2: 133. *pl. 98.* 1816

TORTOLA: Sage Mt., *W. C. Fishlock 85a,* May, 1913.

10. HYMENOSTOMUM BREUTELII (C. Müll.) Broth.; E. & P. Nat. Pfl. 1^3: 386. 1902

Weisia Breutelii C. Müll. Syn. 1: 664. 1849. Not Schimp.

Gymnostomum Breutelii Br. & Sch.; Paris, Index Bryol. 542. 1895.

Weisia senocarpa C. Müll. Syn. 2: 633. 1851.

Gymnostomum senocarpum Jaeger, Adumb. 1: 280. 1873.

Hymenostomum senocarpum Paris, Index Bryol. 597. 1895.

Weisia Pabstiana C. Müll. Bot. Zeit. 15: 382. 1857.

Weisia edentula Sull. Proc. Am. Acad. 5: 273. 1861. Not Mitt.

Hymenostomum cubense Hampe; Paris, Index Bryol. Suppl. 189. 1900.

ST. JAN: Emaus, *Breutel* (type locality); wet banks, Bethania, *Britton & Shafer 209;* Rosenberg and Bordeaux, *Britton & Shafer 288, 534, 569.* ST. THOMAS: on the ground, Water Island, *155;* roadside banks, summit of ridge, Bonne Resolution, *1336;* Bordeaux, *1384;* St. Peter, *1258;* top of Flag Hill, *Fitch & Shafer 1494.* TORTOLA: Peter Island, *Britton & Shafer 860.* ANAGADA: without definite locality, *Britton & Shafer 1039*

11. **Hyophila uliginosa** E. G. Britton sp. nov.

Plants attached to rocks in stream, gregarious and matted together by fresh water algae, soft and flaccid when moist; stems simple, about 5 mm. high, branching at apex; leaves much discolored and clogged with mud at base, green and spreading at summit of stems, about 1 mm. long; base hyaline and oblong; apex lingulate and slightly carinate, apiculate; margins plane, entire or rarely denticulate with a few hyaline teeth at apex; costa stout, papillose on back and smooth above ending in the cuspidate point, in section showing one row of ducts and two small bands of stereid cells; basal cells hyaline, oblong or square, up to 16 μ long by 8 μ wide, upper cells obscure up to 5 μ in diameter, green and densely papillose, with several minute papillae on each surface; dioicous; flowers and fruit unknown; propagating by septate gemmae borne in clusters on brown filaments in the axils of the leaves. [PLATE 1, FIG. 1–6.]

TYPE LOCALITY:—ST. JAN: Bethania, *Britton & Shafer 367.*

12. **Phascum sessile** E. G. Britton sp. nov.

Plants annual(?), gregarious in loose bare earth, on banks; stems simple, or branching at base, with several rosettes from one root, 1–2 mm. high; leaves inrolled with conspicuous yellowish-white costa when dry, bright green in color and spreading when moist, few, 8–12, oblong at base, obovate above, 1–1.25 mm. long by 0.4–0.5 mm. wide; costa percurrent or excurrent into a short cuspidate point, terete and smooth on back, with a narrow dorsal stereid band and 2–3 rows of large ducts; margins entire or finely crenulate and papillose; upper cells hexagonal, up to 13 μ in diameter, densely chlorophyllose with 1–3 papillae on each surface; lower cells hyaline, oblong, 10–12 rows, up to 40 μ long, not papillose, occasionally curved and yellow and slightly auriculate at basal angles; paroicous, antheridia few, with paraphyses, in small buds below or near the archegonia, of which occasionally several are fertilized making 2–3 fruits on one plant; calyptra small, conic, split, slightly papillose at apex; capsule immersed,

sessile on a small brown vaginule, globose, 0.5 mm. in diameter, sharply apiculate, indehiscent; walls with irregular hexagonal cells, 27–32 μ in diameter; spores brown, slightly roughened, 27–30 μ in diameter, maturing in spring. [PLATE 1, FIG. 7–13.]

TYPE LOCALITY:—ST. THOMAS: Cowell Point, *E. G. Britton 99*, February 2, 1913.

DISTRIBUTION:—ST. THOMAS: Water Island, *150*, *156*.

This species belongs to the section *Microbryum* and is close to *P. Floerkeanum*, but differs in the less acuminate and less subulate leaves with plane margins without a yellow border, and more chlorophyllose and papillose cells.

13. TORTULA AGRARIA (SW.) Sw. Fl. Ind. Occ. 3: 1763. 1806

ST. JAN: Bethania, *Breutel;* Bethania, *Britton & Shafer 241*, *268*. ST. THOMAS: on limestone walls of old cemeteries, *Breutel;* on damp earth, Nisky, *77;* Cowell Point, *97;* old walls, Crown Estate, 450 m. alt., *1369;* on rocks at waterfall, Magen's Bay, *1315;* stone walls, Bonne Resolution School, *442*.

14. **Bryum micro-decurrens** E. G. Britton sp. nov.

Plants gregarious, in loose soil, brown at base and also more or less brown above, from the excurrent awns; stems dull green, slender, erect and mostly simple, unbranched, not more than 5 mm. high, matted with brown tomentum at base; leaves erect-appressed when dry, not twisted nor glossy; spreading when moist, less than 1 mm. long by 0.2 mm. wide; costa wide at base 40 μ (at least .2 width of leaf), excurrent into a short subulate brown awn, slightly toothed at apex and on awn; cells of blade hexagonal, 27–40 μ long × 10 μ wide, basal cells shorter, oblong, *with a long, decurrent narrow wing of one row of cells, extending down the stem to the next leaf;* margins bordered by one row of longer narrow cells 5 μ × 54 μ long, slightly revolute below and serrulate above; only known from sterile specimens.

TYPE LOCALITY:—ANAGADA: rocky plain near settlement, *Britton & Shafer 1038*.

DISTRIBUTION:—Mona Island, *Britton & Hess 1751*, *1753*.

These specimens have been compared with type specimens of *B. decursivum* C. Müll. from Porto Rico, kindly loaned to us by Dr. Engler from the Royal Botanical Garden at Berlin, and, though closely related by the decurrent narrow basal wing, ours differs in its shorter leaves, serrate margins and shorter cells.

15. BRYUM CRUEGERI Hampe; C. Müll. Syn. 1: 300. 1849

Dioicous plants bright yellowish green, shining gregarious in loose soil in gravelly bed of stream; stems short, less than 1 cm. high, upper part of stem erect, base decumbent red and radiculose; leaves light yellowish green, glossy, spreading, lanceolate, acute or acuminate, 2 mm. long × 0.35–0.5 mm. broad; costa narrow, ending in the carinate, mucronate apex, margins entire below slightly serrulate at apex, not bordered nor revolute; cells hexagonal 54–108 μ long × 13 μ broad, a few alar, shorter and broader, square or oblong, not decurrent; sterile but often propagating by gemmae.

ST. THOMAS: in bed of stream at Tutu, *422*.

Compared with *Chas. Wright 63* from Cuba, distributed as *B. ovalifolium* Sull., the leaves are slightly narrower and less concave, but they are evidently closely related species and both belong with the group of tropical American species having glossy leaves, and flaccid red stems, resembling a *Pohlia*. They grow mostly along streams and form a closely related group, of which *B. ripense* C. Müll. from Jamaica is also a member.

16. PHILONOTIS SPHAEROCARPA (Sw.) Brid. Bryol. Univ. 2: 25. 1827

ST. THOMAS: moist banks, Bonne Resolution *421;* Crown Estate, 450 m. alt., *1368, 1458*.

17. PHILONOTIS TENELLA (C. Müll.) Jaeger, Adumb. 1: 541. 1873–1874

ST. JAN: on wet banks, near Corallenburg, *Breutel*, 1841; Bethania, *Britton & Shafer 208*. TORTOLA: near Roadtown, 325 m. alt., *Britton & Shafer 773*.

18. PIREELLA CYMBIFOLIA (Sull.) Cardot, Rev. Bryol. 40: 17. 1913

ST. JAN: on wet rock near Bethania, *Britton & Shafer 359*.

19. PTEROBRYUM ANGUSTIFOLIUM (C. Müll.) Mitt. Jour. Linn. Soc. Bot. 12: 426. 1869

TORTOLA: High Bush, *Eggers 3240a*, December, 1887; Sage Mt., *W. C. Fishlock 85*, May, 1913.

20. NECKERA DISTICHA (Sw.) Hedw. Descr. 3: 53. 1792

ST. THOMAS: on rocks at St. Peter, *1456*. TORTOLA: on rock in forest, High Bush, 375 meters alt., *Britton & Shafer 841*.

21. NECKERA JAMAICENSE (Gmel.) E. G. Britton, Bull. Torrey Club 40: 656. 1913

ST. JAN: on bark of trees at Bethania, *Britton & Shafer 364*.

22. CALLICOSTELLA BELANGERIANA (Besch.) Jaeger, Adumb. 2: 257. 1874–1875

ST. JAN: on stones, Bordeaux, 300 meters alt., *Britton & Shafer 548*.

23. STEREOPHYLLUM LEUCOSTEGUM (Brid.) Mitt. Jour. Linn. Soc. Bot. 12: 543. 1869

ST. JAN: Emaus, *Breutel;* Bethania, *Britton & Shafer 1357*. ST. THOMAS: on rocks in shade, ravine at Tutu, *1291*; waterfall near Magen's Bay, *1314*.

24. MITTENOTHAMNIUM DIMINUTIVUM (Hampe) E. G. Britton, Bryologist 17: 9. 1914

ST. JAN: on dead wood, Bordeaux, 400 m. alt., *Britton & Shafer 595*.

25. TAXITHELIUM PLANUM (Brid.) Mitt. Jour. Linn. Soc. Bot. 12: 496. 1869

ST. JAN: *Breutel;* Bethania, *Britton & Shafer 358, 365, 366;* Bordeaux, 400 m. alt., *Britton & Shafer 568, 580*. ST. THOMAS: St. Peter, *1259;* Crown Estate, *1366*. TORTOLA: High Bush, *Britton & Shafer 839*.

26. SEMATOPHYLLUM ADMISTUM (Sull.) Mitt. Jour. Linn. Soc. Bot. 12: 485. 1869

ST. JAN: Bordeaux, 300 m. alt., *Britton & Shafer 554, 556, 578, 579*. ST. THOMAS: St. Peter, on rocks, *1257, 1457*. TORTOLA: High Bush, 375 m. alt., *Britton & Shafer 814, 840*.

27. SEMATOPHYLLUM SERICIFOLIUM Mitt. Jour. Linn. Soc. Bot. 12: 483. 1869.

TORTOLA: on logs in forest, High Bush, 375 m. alt., *Britton & Shafer 819*

28. HAPLOCLADIUM MICROPHYLLUM (Sw.) Broth.; E. & P. Nat. Pfl. I^3: 1007. 1907

ST. THOMAS: shaded bank, Pearl to Bonne Resolution, *1335*.

Explanation of plate 1

The figures were drawn by Mr. R. S. Williams from magnifications twice as great as expressed in the numbers, which represent the magnification of the figures as they stand in the reproduction.

HYOPHILA ULIGINOSA E. G. Britton

FIG. 1. Plant, natural size.
FIG. 2. Propagula, × 35.
FIG. 3. Upper leaf, × 35.
FIG. 4. Cells in upper part of leaf, × 200.
FIG. 5. Cells of leaf base, × 200.
FIG. 6. Cross section in upper part of leaf, × 200.

PHASCUM SESSILE E. G. Britton

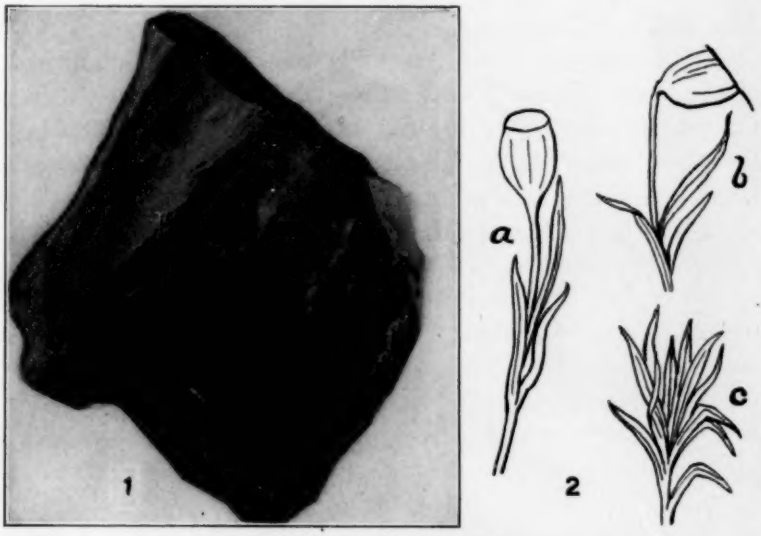
FIG. 7. Plant, × 11.
FIG. 8. Cross-section in upper part of leaf, × 200.
FIG. 9. Cross-section near leaf base, × 200.
FIG. 10. Calyptra, × 35.
FIG. 11. Cells at basal angle, × 200.
FIG. 12. Cells in upper part of leaf, × 200.
FIG. 13. Upper leaf, × 20.

A new American fossil moss

ELIZABETH G. BRITTON AND ARTHUR HOLLICK

(WITH TWO TEXT FIGURES)

Some seven years ago it was our privilege to describe the first known specimen of an American fossil moss in fruit, under the name *Glyphomitrium Cockerelleae*,* found at Florissant, Colorado.



FIGS. 1, 2. *Plagiopodopsis Scudderi* E. G. Britton & A. Hollick. FIG. 1. Photograph of specimen, natural size. FIG. *2a*. A single plant enlarged about five times, showing capsule and leaves. FIG. *2b*. Part of another plant, similarly enlarged. FIG. *2c*. A sterile plant, similarly enlarged.

Recently we received from Dr. F. H. Knowlton, of the United States National Museum, another similar specimen from the same locality, which represents, however, a different and, apparently, an undescribed genus.

* Elizabeth G. Britton and Arthur Hollick, Bull. Torrey Club 34: 140, *pl. 9, f. 6, 6a*. 1907.

Plagiopodopsis Scudderi gen. et sp. nov.

Plants cespitose, matted together by basal radicles: stem about 1 cm. high, erect, simple or branching; leaves crowded, spreading, about 2 mm. long by 0.5 mm. wide, lanceolate-acuminate, costate to apex; perichaetial leaves longer extending to or beyond the capsule; seta terminal, 2–3 mm. long, erect and partly exserted; capsule ovoid, 1.5 mm. long by 0.75 mm. broad, erect or inclined, rugose or plicate; mouth 0.5 mm. broad, too indistinct to show any traces of peristome; calyptra and lid unknown.

Named in honor of Mr. Samuel H. Scudder, by whom it was collected about the year 1875, in the Tertiary (Miocene) shales of Florissant, Colorado. Type specimen in U. S. National Museum.

It resembles the living species *Plagiopus Oederi* (Gunn.) Limpr. of the Bartramiaceae in size, habit, etc., but is too poorly defined for anything more than identification of its close relationship to the genus *Plagiopus*, as indicated in the generic name adopted for it.

Phytogeographical notes on the Rocky Mountain region
IV. Forests of the Subalpine and Montane Zones*

P. A. RYDBERG

The mountain regions may be divided into four zones: (1) the ALPINE ZONE, above the timberline; (2) the SUBALPINE ZONE; (3) the MONTANE ZONE; (4) the FOOTHILL ZONE. These correspond to Dr. Merriam's ARCTIC, HUDSONIAN, CANADIAN, and TRANSITION life-zones, respectively. The Alpine Zone has already been discussed by me in three preceding papers. The Subalpine and Montane Zones are more or less mesophytic, while the Foothills are decidedly xerophytic. The characteristic trees of the last are the bull pines and nut-pines and the cedars, which there seldom form dense woods, but grow more or less scattered on the hillsides. The Subalpine and Montane Zones are characterized (with the exception of the exposed ridges and larger open valleys or "parks") by more or less dense woods of spruce, fir, pines and aspen. Many do not distinguish these two zones, and no definite line can be drawn between them. Most of the plants are common to both; the most characteristic tree of the Subalpine Zone, the Engelmann spruce, extends far down into the Montane Zone, and several of the principal components of the latter, especially the Douglas spruce, extend far up into the former. In general the division line may be placed at the upper limit of growth of the bull-pine and the lower of the subalpine fir. This varies considerably. In Colorado it may be placed at an altitude of 3,000 m. (10,000 ft.), in the Yellowstone National Park at 2,300–2,500 m. (7,500–8,000 ft.), in the Glazier Park Region of Montana at

* This article is not intended to present any new facts, but merely a summary. The only feature as far as I know that has never been presented in print in this form is the division line drawn between the Northern and Southern Rockies and the reasons for drawing it at that particular place. The distribution of the forest trees both altitudinally and geographically has been treated more extensively and in greater detail elsewhere, both in the various "tree books" and in the reports from the United States Forest Reserves, but a short resumé is always desirable.

about 2,000 m. (6,500 ft.), and in the Selkirk Mountains of British Columbia still lower.

A region which extends twenty degrees in latitude* will naturally not be homogeneous, as far as its vegetation is concerned. It also can be divided into two principal parts: the Northern and the Southern Rockies. In Wyoming, about where the Union Pacific Railroad is drawn across, there is a break in the high mountain chain. This break may be regarded as the division line between the Northern and the Southern Rockies.

The larger part of the Southern Rockies is within the state of Colorado, but they extend south into New Mexico to Santa Fe, and northward into Wyoming, where they are known as the Medicine Bow Mountains. West of the Southern Rockies and separated from them by the Green River basin are the Uintah and Wasatch Mountains. The former have practically the same flora as the Southern Rockies, but the western slope and southern end of the Wasatch Range partake of the floral nature of the isolated mountain chains of the Great Basin. The northern end of the Wasatch Mountains, the range enclosed by the horseshoe bend of the Bear River in southern Idaho, is the most northerly extension of the floral district of the Southern Rockies. It is here and across the Bear River in the Teton Mountains, not along the continental divide in Wyoming, that the floras of the Northern and Southern Rockies meet.

The Northern Rockies form an uninterrupted chain from Yukon Territory to the Wind River Mountains in Wyoming and the flora is practically homogeneous, except the western slope of the northern portion. To the Northern Rockies should also be counted several more or less isolated mountain ranges, as the Saw-tooth Mountains of central Idaho, the Tetons of western Wyoming, the Cypress Hills in Saskatchewan, several ranges in Montana, the Bighorn Mountains in northern Wyoming and the Black Hills and several smaller chains in their neighborhood. None of these except the Big Horns and the Tetons can be taken in account when the subalpine flora is considered. The Selkirk Mountains between the bends of the Upper Columbia River,

* My discussion in this paper refers only to the region between 35° and 55° latitude.

much closer to the Rockies, and separated from the Cascades by the Columbia and Frazer River valleys, have a flora resembling that of the Cascades as much as that of the Rockies. This Cascade flora, however, extends also to the western slopes of the Rockies in British Columbia and northern Montana as well as into the Bitter Root Mountains between that state and Idaho, although the Bitter Roots are separated from the Selkirks by the valleys of Kootenay River and Clark's Fork.

This division between Northern and Southern Rockies is not made merely on geographical grounds, i. e., because there is a break in the high mountain chain where the plains actually cross over the continental divide. The flora shows also many differences; this is especially the case with the more characteristic species, the trees. It is true that a number of these are common to the Northern and Southern Rockies, as, for instance, *Picea Engelmannii*, *Pinus scopulorum*, *Pinus Murrayana*, *Pinus flexilis*, *Pseudotsuga mucronata*, *Abies lasiocarpa*, *Sabina scopulorum*, *Betula fontinalis*, *Alnus tenuifolia*, and several species of *Crataegus*, *Salix*, and *Populus;* but others are not.

Pinus aristata, *P. edulis*, *Picea Parryana*, *Abies concolor*, *Sabina utahensis*, *S. monosperma*, *Populus Wislizeni*, *P. Fremontii*, *Fraxinus anomala*, and the oaks of the *Quercus Gambellii* and *Q. undulata* groups are characteristic of the Southern Rockies. Of these only *Picea Parryana* has been collected in what belongs to the Northern Rockies. The only authentic locality there that I know is in the Teton Mountains, and these are, as stated before, in the region where the two floras meet. *Abies concolor* extends into the Bear River Mountains but does not cross the line, although it is found much farther north in western Oregon. It has been reported from other parts of Idaho, but evidently has been confused with *A. grandis*, at least all specimens I have seen named *A. concolor* belong to that species. *Sabina utahensis* is found on the southwestern slopes of Wind River Mountains in the Green River basin, but this species belongs to the foothills and not to the mountains proper. The only oak found in the Northern Rocky Mountain region is *Quercus macrocarpa*, and this only in the Black Hills. It is not found in the Southern Rockies and it is an invader from the prairie region. The same can be said

about *Ulmus americana* and *Ostrya virginiana*. There are still more trees of the Northern Rockies which are not found in the southern part, such as *Larix occidentalis*, *L. Lyallii*, *Abies grandis*, *Tsuga heterophylla*, *T. Mertensiana*, *Picea albertiana*, *Pinus monticola*, *P. albicaulis*, *Thuja plicata*, *Taxus brevifolia*, several species of *Betula* and *Salix*, *Populus trichocarpa*, *P. hastata*, and *P. Besseyana*. It is true that most of the conifers mentioned belong principally to the Selkirk-Bitter Root region, but this is not the case with *Picea albertiana* and *Pinus albicaulis*, which extend as far south as the Yellowstone Park. *Abies grandis* has also been reported from there, and *Pinus monticola* a little north thereof.

SUBALPINE ZONE OF THE SOUTHERN ROCKIES

The characteristic trees of the Subalpine Zone of the Southern Rockies are *Picea Engelmannii* and *Populus tremuloides*, with *Pinus aristata* and *Abies lasiocarpa* as secondary ones.

The ENGELMANN SPRUCE, or, as it is usually called in the Rockies, the white spruce, has its best development in Colorado at an altitude between 10,000 and 11,500 feet. It extends up to the timberline, 11,500–11,800 feet or rarely up to 12,000 feet. This region from about 10,000 feet to the timberline may therefore be regarded as the Subalpine Zone. The spruce grows often in pure stands, as in the La Sal Mountains, or mixed with the subalpine fir, *Abies lasiocarpa*, and the forests usually cover the northern slopes, except where the conditions are such that no trees can grow. In favorable localities it also grows on the southern slopes, there occasionally mixed with *Pinus aristata*. It is not confined, however, to the Subalpine Zone, but extends far down on the northern slopes into the Montane Zone as low as to 7,000 or 6,500 feet altitude. Here, as well as in the lower portion of the Subalpine Zone, it is often mixed with the Douglas or red fir, *Pseudotsuga mucronata*, the blue spruce, *Picea Parryana*, the balsam fir, *Abies concolor*, the limber pine, *Pinus flexilis*, and the lodge-pole pine, *Pinus Murrayana*. *Picea Engelmannii* extends throughout the northern Rocky Mountain region, but is not there so exclusively the tree characteristic of the Subalpine Zone.

The Engelmann spruce is a slender tree with narrow crown,

therefore offering little resistance to the wind. The branches are short, slender and deflexed, therefore well adapted for shedding the falling snow. It is, hence, very well adapted to the severe climate of the mountain peaks. At the timberline it, as well as *Abies lasiocarpa*, becomes stunted, low, with the lower branches enormously elongated and closely pressed to the ground. The Engelmann spruce is a slow grower, naturally so on account of the poor and rocky soil and the severe climate. On a stump from a tree cut in the La Sal Mountains, measuring 26 inches, I counted over 260 annual rings. In very favorable conditions it may reach a height of 120 feet and a diameter of about 3 feet.

Next to the Engelmann spruce, the ASPEN is the most common tree in the Subalpine region of Colorado. It grows on both slopes, usually in groves, but sometimes mixed, and usually prefers rich soil. After the spruce wood has been destroyed by forest fires, it often takes possession of the ground, as its seeds germinate more quickly and it is a faster grower. It reaches its best development along streams and in springy places. It is seldom found up to an altitude of more than 11,000 feet and its height is seldom over 25 or 30 feet in this region.

The FOX-TAIL PINE, range pine, or prickle-cone pine, *Pinus aristata*, is the chief tree of the southern slopes of the Southern Rockies. It is not found in the Northern Rockies at all, but exists in the mountains of the Great Basin and in the southern Sierra Nevada. It is a bulky tree, branched usually near the base. In favorable situations it sometimes reaches a height of 50 feet, with a trunk 3 feet in diameter. Near the timberline it becomes very gnarled, crooked, and twisted, with the branches short and few on the windward side and unproportionally developed on the leeward one. It never forms the depressed cushion-like or sugar-loaf-like growth of *Picea Engelmannii* or *Abies lasiocarpa* in similar situations. *Pinus aristata* is a characteristic tree of the Sulbapine Zone, only rarely found in the Montane Zone as low as 8,000 feet. If found there it grows mostly with *Pinus flexilis*, as it does sometimes in the Subalpine Zone.

The fourth of the trees of the Subalpine Zone is the SUBALPINE FIR, *Abies lasiocarpa*. It usually grows scattered among *Picea*

Engelmannii or at lower altitudes sometimes with *Pinus Murrayana*. It is usually a small tree, very rarely reaching 70 or 80 feet in height, with a trunk of 2 feet in diameter, the average good-sized tree being 45 or 50 feet high. It is found at an altitude of from about 9,000 feet to the timberline.

The limber pine, *Pinus flexilis*, belongs really to the Montane Zone, where it has its best development, but extends into the Subalpine Zone almost to the timberline.

SUBALPINE ZONE OF THE NORTHERN ROCKIES

As the Northern Rockies are of much larger extent than the Southern and the conditions are much more variable, the description of the different zones of one locality will poorly fit for all places. I shall therefore first select a fairly typical region near the center of the district and then contrast with this the outlying regions. The region selected is the main range of the Rockies in northern Montana. The Subalpine Zone in this region extends from an altitude of about 6,500 feet to the timberline. The most important tree is, as in the Southern Rockies, the Engelmann spruce (*Picea Engelmannii*), but it becomes less predominant, and the subalpine fir, *Abies lasiocarpa*, becomes more frequent. Both are characteristic of the northern exposures.

The ENGELMANN SPRUCE, just as in the Southern Rockies, is not limited to the Alpine Zone, but runs down through the Montane Zone to a little below 5,000 feet, and is there confined mostly to the northern slopes and valleys. In this region it sometimes reaches a height of 125 feet, with a trunk 3 feet in diameter. In some places especially on the west side of the Bitter Root Mountains, it is more or less supplanted by the next.

The SUBALPINE FIR, *Abies lasiocarpa*, grows between an altitude of 6,000 feet and timberline, rarely lower down. Under favorable conditions it reaches a height of 75 feet, with a trunk diameter of 2 feet.

The WHITE-BARKED PINE, or, as it is called in Montana, the nut pine, *Pinus albicaulis*, takes the place of *P. aristata* on the southern exposures, often growing scattered in grassy "parks." It resembles the same somewhat in growth, although it is more closely related to *P. flexilis*. It is a tree 20 to 40 feet high, with a trunk

1 to 4 feet thick. At the timberline it becomes low, crooked, and gnarled.

The LYALL'S LARCH, *Larix Lyallii*, is the most hardy tree of the region. In moist valleys it reaches higher up than either the spruce or the fir, and is more strictly a subalpine species than either, growing mostly above 7,500 feet altitude. In the main Rockies, it is not found south of latitude 48° 45′, but runs further south in the Bitter Root Mountains. It is mainly confined to the western slope of the Rockies, and crosses the main divide only north of Culver Glazier, latitude 48° 50′. It is a tree of slow growth, becoming 25 to 40 feet high and having a diameter of 2 to 4 feet.

The ASPEN plays here the same rôle as in the Southern Rockies, but is perhaps not so common.

In the lower portion of the Subalpine Zone, the lodge-pole pine, limber pine and Douglas fir are found on the drier slopes. In some places the former tree is the most common of all. The limber pine is rare on the west side of the divide.

In the Bitter Root Mountains the dividing line between the Subalpine and Montane Zones is slightly lower. The principal trees here are the same as in the main Rockies. The general distribution of the subalpine fir is above 4,800 feet in the northern part and 5,500 feet in the southern part, although it sometimes descends as low as 3,000 feet. Here it is much more common than *Picea Engelmannii* and is the characteristic tree of the Subalpine Zone. The latter grows mostly at 4,000 to 7,000 feet altitude. Lyall's larch is found along the main range of the Bitter Root Mountains to the headwaters of the south fork of the Clearwater River, latitude 45° 50′. *Pinus albicaulis* grows mostly above 6,000 feet altitude. *Pinus Murrayana* ascends to 8,000 feet and *Pseudotsuga mucronata* to 6,500 or 7,000 feet. *Pinus flexilis* is wanting. The first of these three species, i. e., *P. Murrayana*, is the most common tree on the eastern slopes of the Bitter Root Mountains and there makes up about ninety per cent. of the forest.

To the other subalpine trees are here added the ALPINE HEMLOCK, *Hesperopeuce Mertensiana*. It grows at an altitude of from 5,500 to 8,000 or even 9,000 feet. It is a tree of 60 to 100 feet in

height and 3 to 6 feet in diameter with a greatly developed crown. It is not found in the main Rockies, at least not within the United States. It is not uncommon in the Selkirks and extends south in the Bitter Roots as far as to the divide between the north and middle forks of Clearwater River.

In the Yellowstone Park and in the Tetons, the Subalpine Zone begins at an altitude of 7,500 or 8,000 feet and the timberline is at an altitude of about 10,000 feet. The trees are the same as those of northern Montana, except that the Lyall larch is lacking and the lodge pole pine is more common near the lower border.

In the Big Horn Mountains both the Engelmann spruce and the subalpine fir are scarce and in most cases the upper limit of the lodge pole pine constitutes the timberline.

In the Black Hills a Subalpine Zone can scarcely be spoken of, as the highest mountains are less than 7,500 feet. The subalpine species of the Rockies are wholly lacking.

MONTANE ZONE OF THE SOUTHERN ROCKIES

The upper and lower limits of the Montane Zone in Colorado are approximately at an altitude of 10,000 and 7,500 to 8,000 feet. The former is about the upper limit of *Pinus scopulorum*, the latter near the lower limit of *Pinus Murrayana*, and *Pseudotsuga mucronata* is rare below this altitude in Colorado. These three trees together with *Picea Engelmannii* are the most important timber trees of this zone.

The southern slopes of the mountains and the tops of the table lands are more or less xerophytic, and here the bull pine or yellow pine, *Pinus scopulorum*, and the Douglas or red fir, *Pseudotsuga mucronata*, are predominant. The northern slopes and more protected valleys and flats are decidedly mesophytic. The predominant tree on the northern slopes and in the valleys is the Engelmann spruce. The lodge-pole pine, *Pinus Murrayana*, is often found with the Engelmann spruce, but is often found on the upper plateaus in pure stands or mixed with the more xerophytic species.

The composition of the more *xerophytic forest* of the southern slopes is as follows:

The most important tree is perhaps the BULL PINE, *P. scopulo-*

rum, or, as it perhaps is more often known, *P. ponderosa scopulorum*. It is seldom found in Colorado above an altitude of 10,000 feet, which the writer regards as approximately the upper limit of the Montane Zone. It descends, however, far below the lower limit of this zone, even below an altitude of 5,000 feet; it is really in fact the only important tree of the foothills. It is a tree of wide distribution found nearly everywhere in the Montane and Foothill Zones of the whole Rocky Mountain region, as treated in this article. The only mountains I know of where it is lacking are the La Sal Mountains in eastern Utah, where the Douglas fir is also missing. The bull pine is a massive tree, sometimes becoming 110 to 125 feet in height and with a trunk almost 4 feet in diameter. A tree 3 feet in diameter is about 250 years old.

The DOUGLAS FIR, red fir, or red spruce, *Pseudotsuga mucronata*, is almost as important as the bull pine. It usually grows with the latter and reaches about the same size. It is common at an altitude of between 7,000 and 10,000 feet, but ascends sometimes as high up as 10,500 and very rarely up to nearly 11,000 feet, and descends seldom in the ravines as low as 6,000 feet. In the higher altitudes it mixes with *Pinus flexilis* and *P. aristata*, rarely with *Picea Engelmannii*, in the lower extremes it grows with the latter and *Abies concolor*. As to its geographical distribution, the Douglas fir has about as wide a distribution as any Rocky Mountain coniferous tree, the other widely distributed ones being *Picea Engelmannii* and *Pinus Murrayana*, and is surpassed among the trees only by the aspen. It ranges from Alberta and British Columbia to western Texas, northern Mexico and southern California.

The LODGE-POLE PINE comes next in importance. This is the most common conifer in the Montane Zone of the Northern Rockies, but is not so common nor so important in the Southern. It often grows in pure stands on gentle slopes or flats, but mixes also with other pines as well as with the Engelmann spruce. As the lodge-pole pine germinates more readily than the other conifers, it often takes possession of burnt-over areas, just as the aspen does. The young trees usually spring up close together and form almost impenetrable thickets. Standing so close together the trees grow very slowly in size and large trees are rare.

In open places they rarely reach a height of 50 feet and a trunk diameter of 2 feet or a little more. In Colorado the species grows at an altitude of 8,000 to 10,500 feet, sometimes descending below 8,000 feet and rarely reaching an altitude of 11,000 feet. Its range extends farther north than that of the *Pseudotsuga*, viz., up to Alaska, but not so far south.

The LIMBER PINE or white pine of Colorado, *Pinus flexilis*, is rather local, never plentiful, and as a rule mixed with other trees, mostly with *Pinus scopulorum* and *Pseudotsuga mucronata* at lower altitudes and with *Pinus aristata* at higher ones. It ranges from an altitude of 7,500 feet nearly up to timberline. It is therefore a tree common to the Subalpine and the Montane Zones. In general appearance it is intermediate between the foxtail pine and the bull pine and is often mistaken for either. It ranges from Alberta to western Texas and southern California.

The red cedar, *Sabina scopulorum*, belongs rather to the Foothill Zone, but ascends often to an altitude of 9,000 feet and grows associated with the bull pine.

The composition of the *mesophytic forest* of the northern slopes consists of the following trees:

The principal tree here, as in the Subalpine Zone, is the ENGELMANN SPRUCE, which has been discussed already.

The subalpine fir is found mostly in the transition region between 9,500 and 10,000 feet, rarely as low as 9,000 feet altitude.

The BALSAM FIR or Colorado white fir, *Abies concolor*, takes its place at lower altitudes, viz., between 8,000 and 9,000 feet. It is a tall symmetrical tree with short horizontal branches, sometimes reaching a height of 250 feet. Its geographical distribution extends over the Southern Rockies, Sierra Nevada and other mountains of California, north to the Siskiyou Mountains of Oregon, but it is not found in the Northern Rockies.

The Douglas fir and the lodge-pole pine are also mixed occasionally with the Engelmann spruce.

Along the water-courses the composition of the forest is as follows:

The COLORADO BLUE SPRUCE, *Picea Parryana*, is growing along the water courses in the region mostly occupied by the bull pine and Douglas fir. It is therefore often found on the southern

slopes. It needs a good deal of moisture, but at the same time prefers an open forest, and stands less shade than the Engelmann spruce. This explains perhaps why it succeeds better as a planted tree in the Eastern States than any other western species. It ranges in altitudes from 6,500–9,000 feet or sometimes 10,000 feet, but descends into the foothills only in the valleys. It grows to the height of 90 feet and a trunk diameter of 2½ feet, or becomes rarely 100 feet high and 4 feet thick. It is limited to the Southern Rockies, and has been collected, as far as I know, only at one locality in what I regard as belonging to the Northern Rockies, viz., the Teton Mountains of western Wyoming.

The NARROW-LEAVED COTTONWOOD, *Populus angustifolia*, grows along the streams throughout the foothills as well as the Montane Zone, in other words at an altitude between 5,000 to 10,000 feet, or rarely as high as 10,500 feet. It becomes sometimes 50 feet high with a trunk nearly 2 feet in diameter, but this size is extremely rare. Individuals with somewhat broader leaves are sometimes mistaken for the balsam poplar, *P. balsamifera*. *Populus angustifolia* is distributed from North Dakota and Washington to New Mexico and California. The BALSAM POPLAR, *Populus balsamifera*, is rare in Colorado and belongs to the northern Rockies. It has about the same altitudinal distribution as the preceding and attains the same size or a little larger.

The WESTERN BLACK BIRCH, *Betula fontinalis*, and the ROCKY MOUNTAIN ALDER, *Alnus tenuifolia*, grow in similar situations, but never become trees of any large size. They are found throughout the Rocky Mountain region, in Colorado growing at an altitude between 5,500 and 9,000 feet, the latter sometimes reaching 10,000 feet.

Several species of willows are also found but most of these are mere shrubs.

The hawthorns (several species of *Crataegus*) and chokecherry, *Prunus melanocarpa*, enter the lower valleys but belong really to the foothills or Great Plains.

MONTANE ZONE OF THE NORTHERN ROCKIES

The Montane Zone of the Rockies in northern Montana contains more species than in Colorado, especially on the western

side of the continental divide. On the eastern side the species are somewhat the same, but the proportion is different.

Eastern slope

The most common tree is the lodge-pole pine, growing on the dryer ridges from 5,000 to 8,000 feet altitude. It grows often in pure stands or mixed with Douglas fir and limber pine.

The Rocky Mountain bull pine, *Pinus scopulorum*, if found at all, is limited to the foothills or the mountain sides bordering thereon.

In the valleys with northeastern or northern exposure, the Engelmann spruce often is mixed with red fir and the ALBERTA SPRUCE, *Picea albertiana*. The latter is not generally distinguished from *Picea Engelmannii* or else mistaken for the eastern white spruce, *Picea canadensis*, which is not found in Montana, and further south for the blue spruce, *P. Parryana*. It much resembles the Engelmann spruce, but the twigs are glabrous and the cone-scales more rounded. The Engelmann spruce runs down as low as 6,000 feet altitude.

The deciduous trees are found mostly along the water courses. The most important are *Populus balsamifera* and *P. angustifolia*, *Betula papyrifera* and *Betula fontinalis*, *Alnus tenuifolia* and a few willows.

Western slope

The southern exposure is, as in the Southern Rockies, more xerophytic and this is mostly occupied by the lodge pole pine and the Douglas fir, ranging at an altitude between 3,000 or 4,000 to 7,000 or 8,000 feet. Below 4,000 feet the forest consists mostly of the WESTERN YELLOW PINE, *Pinus ponderosa*. This is closely related to *P. scopulorum* but has longer leaves and cones. Many regard the latter as a variety of the former. *P. ponderosa* is practically limited to the Pacific slope and has been reported from very few localities east of the divide. Contrary to its southeastern relative, it is found on rich soil. It belongs to the Arid Transition Zone of Washington and enters the Montane Zone only at its upper limit. It is a tree often over 200 feet high and with a trunk 5–8 feet in diameter.

On the northern exposures and in the canyons, the Engelmann

spruce and the Subalpine fir in the upper part are common; but at an altitude of 5,000 or 6,000 feet, are met with the western tamarack or larch, silver fir, western hemlock, white cedar and western white pine.

The WESTERN TAMARACK, or LARCH, *Larix occidentalis*, grows at an altitude of from 3,000 to 6,000 feet or rarely 7,000 feet, and always close to the water courses. It is a tree 60–150 feet high and 2–4 feet in diameter. Further west it sometimes attains a height of 250 feet and 6–8 feet in diameter. It ranges from British Columbia to western Montana and Oregon, east of the Cascades. No station east of the divide has been recorded, as far as the writer knows.

The SILVER FIR, *Abies grandis*, grows up to an altitude of 6,000 feet, rarely 7,000 feet. Near the Pacific coast it attains a height of 250–300 feet and a diameter of 4 feet, but in the mountains it seldom becomes more than 100 feet high and 2 feet thick. Its distribution is from Vancouver Island to western Montana, Idaho and northern California. It hardly crosses the Continental Divide in northern Montana, but has been reported from the Yellowstone National Park.

The WESTERN HEMLOCK, *Tsuga heterophylla*, grows up to an altitude of 6,000 feet. On the coast it becomes a tree 200 feet high. It is distributed from British Columbia and western Montana to central California. It, as well as the next, barely crosses the Continental Divide north of St. Mary's Lake.

The WHITE CEDAR, or western arbor-vitae, *Thuya plicata*, grows also up to about 6,000 feet. It is a tree sometimes 200 feet high and with buttresses 15 feet in diameter, but in Montana it is much smaller. Its distribution extends from Alaska to western Montana and northern California.

The MOUNTAIN WHITE PINE, *Pinus monticola*, extends to about the same altitude in Montana, but much higher in California. It is generally a tree 100 feet high and 4–5 feet in diameter, rarely larger. It grows mostly on bottom-lands and along streams. Its distribution is from British Columbia and northwestern Montana to Kern County, California. It is not found east of the divide in northern Montana, but has been reported in southern Montana from the valleys of Davis and Slough Creeks north of the Yellowstone National Park.

The deciduous trees belonging to this zone grow all along the water courses. They are: the cottonwoods, *Populus trichocarpa*, the tallest deciduous trees of America, *P. hastata*, *P. Besseyana*, *P. balsamifera*, *P. angustifolia* (rare on the west side), and *P. tremuloides* (the three first are seldom found east of the divide); further, such willows as *Salix Lyallii*, *S. sessilifolia*, *S. Mackenzieana*, *S. Scouleriana*, and several others, scarcely becoming trees; the birches, *Betula papyrifera*, *B. fontinalis*, *B. Piperi*, *B. subcordata*, and *B. occidentalis;* alders, *Alnus tenuifolia;* several species of *Crataegus* and *Amelanchier*, etc.

The Montane Zone in the Canadian Rockies is practically the same, but both its upper and lower limits are found gradually lower and lower down the mountains the further north one goes.

In the Bitter Root Mountains, it resembles much that of the western slope of the Rockies. To the conifers are added the PACIFIC YEW, *Taxus brevifolia*, which often becomes only an insignificant shrub. The extent of the Zone is between 4,000 and 5,800 feet altitude and the most important trees here on the northern exposures are the mountain white pine, *Pinus monticola*, which, however, extends in the valleys as far down as 2,000 feet altitude, and *Larix occidentalis*. On the southern exposures, *P. ponderosa* and *Pseudotsuga mucronata* are predominant.

In the Yellowstone National Park and mountains north thereof, about half of the coniferous flora consists of the lodge-pole pine. Otherwise the conditions are the same as on the eastern slope in northern Montana, that is with a small amount of *Picea Engelmannii* and *P. albertiana* on the northern exposures; *Pinus flexilis* and *P. ponderosa* on the southern exposures, but the latter two only near the lower limit; some *Pseudotsuga* on both, and aspen and cottonwood along the water courses. On the level plateaus of the Yellowstone National Park the forest consists of pure stand of *Pinus Murrayana*. A small number of *Pinus monticola* has been found on Davis Creek and Slough Creek in southern Montana and *Abies grandis* has been reported from Yellowstone Park.

In the Big Horn Mountains the coniferous forest is represented by but four species: *Pinus Murrayana*, *P. flexilis*, *Picea Engelmannii* and *Pseudotsuga mucronata*, of which the first makes up perhaps ninety per cent. of all.

The forest in the Black Hills consists mostly of bull pine, *Pinus scopulorum*. On the northern exposure of Harney Peak and the northern end of the limestone district above an altitude of 4,500 feet, there is some spruce, but it is not *Picea Engelmannii* but a form of the white spruce, *Picea canadensis*, with unusually short cones. This attains a height of about 100 feet and a diameter of nearly three feet. *Betula papyrifera*, *B. fontinalis*, *Populus angustifolia* and *P. tremuloides* are present. In the Foothill Zone are added *Quercus macrocarpa*, *Negundo interius*, *Populus Sargentii*, *P. acuminata*, *Ulmus americana*, *Ostrya virginiana*, and *Sabina scopulorum*. From this can be seen that the Black Hills do not represent a typical part of the Northern Rockies, as their forest flora contains fully as many species belonging to the eastern United States.

NEW YORK BOTANICAL GARDEN

The ferns and flowering plants of Nantucket—XIV

EUGENE P. BICKNELL

PRIMULACEAE

SAMOLUS FLORIBUNDUS HBK.

In damp places either in fresh or in brackish soils. Common on marshy levels about ponds on the south shore; near Abram's Point; Shawkemo meadow; Pocomo. At the south shore it was in full flower June 8, 1908; near the north shore seedling plants only were found June 8, 1911, and first flowers not until July 1, 1912; continues in bloom through September.

LYSIMACHIA VULGARIS L.

An abundant growth along a weedy lot on Sea Street, first seen in 1899, continued to flourish there for many years until, in 1912, it was nearly exterminated by improvement of the grounds. Collected in full flower August 18, 1878, by Edwin Faxon. Still in full bloom September 10, 1907. Mrs. Owen mentions one patch in the southern part of the town and one at Siasconset, both of which had existed for some ten years prior to 1886.

LYSIMACHIA QUADRIFOLIA L.

In thickets and open ground, common. In dry exposed places it is often dwarfed, with leaves greatly reduced in size; a form with deeper green and much broadened leaves is occasionally found in shade and richer soil. First flowers June 13, 1908; June 16, 1910; June 27, 1912.

LYSIMACHIA TERRESTRIS (L.) BSP.

Common in low grounds and along pond shores. Flower buds June 15, 1908, but no open flowers up to June 20; first flowers June 23, 1910; June 27, 1912.

LYSIMACHIA NUMMULARIA L.

Naturalized at several places in and near the town; in abundance below the railroad embankment near Orange Street. First flowers June 18, 1908; June 18, 1910; June 28, 1912.

TRIENTALIS AMERICANA (Pers.) Pursh.

Common in shaded thickets and having a very brief flowering period. First flowers June 1, 1909, few flowers remaining June 9; no flowers seen in any year after the middle of June.

* GLAUX MARITIMA L.

In Rhodora (4: 215–216. 1902) Dr. Fernald, publishing his description of *Glaux maritima* var. *obtusifolia*, attributes the plant to Nantucket—"Aug. 18, 1878 (*Faxon*)." At that time there was no reason to suppose that the Faxon specimens thus cited might have become incorrectly labeled, but it is now thought that quite possibly such a mishap may have occurred. Mr. Floyd has acquainted me with what is known of the history of these Faxon specimens. They were contained in a bundle of unmounted plants collected by Mr. Faxon which, after his death, were turned over to the Gray herbarium. The specimens were folded in a sheet containing no label but bearing on the outside the pencilled record in Mr. Faxon's hand "Nantucket, Aug. 18, 1878." The bundle was made up of duplicates from the Faxon herbarium which, however, contained no corresponding specimens of this *Glaux* although it did possess examples of the plant collected at Plymouth, Massachusetts, only one week before the day when Mr. Faxon collected on Nantucket. These facts make it appear not at all improbable that, by some mischance, duplicates of the Plymouth collection had been passed along in a sheet that had been inadvertently labeled or, perhaps, previously used for some Nantucket specimen. At all events the Nantucket record must rest under reservations unless established by the future discovery of the plant on the island.

There is an earlier record of this species from Nantucket which is more certainly an erroneous one. The name appears in Mrs. Owen's first list of Nantucket plants, which was published in Godfrey's "Island of Nantucket," etc., 1882. It was omitted from her completed list of 1888. An explanation of this is given by Mr. Floyd who tells me that in a letter received by him from Mrs. Owen, dated May 12, 1909, the writer declares, "as for *Glaux maritima* I repudiate utterly at this time the insertion of it in the Godfrey catalogue."

By all this it appears that there is no unquestioned evidence

that *Glaux maritima* has ever been found on the island of Nantucket. Nevertheless it may not properly be omitted from the present catalogue since it has been collected in the County of Nantucket on the nearby island of Tuckernuck, where it was found in abundance by Mr. Joseph A. Cushman in 1909 and 1910 (Rhodora 13: 105. 1911). A specimen of this collection, kindly given to me by Mrs. Albertson, seems to be quite fairly representative of the smaller-leaved and widely branched typical state of the plant as Mr. Cushman has reported. It is to be noted in this connection that the Faxon specimens labeled for Nantucket, of which there is an excellent sheet in the herbarium of the New York Botanical Garden, are pronounced examples of the *obtusifolia* form of the species.

ANAGALLIS ARVENSIS L.

Very common in fields, by roadsides and on brackish sandy shores; often growing thickly in once cultivated tracts and disturbed ground. First flowers June 13, 1911, June 17, 1908, June 20, 1910, June 30, 1912; blooming through September.

PLUMBAGINACEAE

LIMONIUM CAROLINIANUM (Walt.) Britton.

Common in salt marshes. Some flower buds showing color July 13, 1912; in full flower through September.

OLEACEAE

SYRINGA VULGARIS L.

Often persisting and spreading about abandoned grounds and by roadsides. In bloom as late as June 12, 1911.

* FRAXINUS AMERICANA L.

Among a growth of pines, almost a woodland, on the Surfside road, about a mile from the town, are eight or more white ash trees scattered through an elongated area of perhaps seventy-five yards. In 1907 these trees were from eight to fourteen feet in height, the larger trunks fifteen inches in circumference. Some of them had been at one time chopped off close to the ground and had produced a second growth of tall shoots. This tree is certainly not indigenous to Nantucket and there can be no doubt

that these were planted many years before. The larger pines about them were fully twenty feet in height. Other white ash trees, evidently planted, grow in open ground near the cemeteries on the southeast side of the town.

Note.—Fine examples of the European ash (*Fraxinus excelsior* L.), some of them of large dimensions, may be seen along North Water Street and other streets of the town. They fruit prolifically, producing green clusters of samaras early in June, and seed themselves freely, growing up into saplings here and there in undisturbed places. After the severe winter of 1912 the upper branches of most of these trees having a northern exposure had been winter killed while those in more protected situations were uninjured. Vernation is late and, in backward seasons, the trees appear still quite leafless as late as the end of May.

GENTIANACEAE

CENTAURIUM SPICATUM (L.) Fernald.

Erythraea spicata (L.) Pers.

First recorded from Nantucket, and from America, in 1841, by William Oakes in Hovey's Magazine (7: 178, as *Erythrea Pickeringii* Oakes) having been collected in September, 1829. It grows along the borders of salt meadows and small tidal ponds, and is found along the north side of the island in Shimmo, Shawkemo, Quaise and Pocomo at numerous points over a distance of about three miles, and was collected by Mr. Walter Deane, Sept. 10, 1885, at Coskaty, some two and one half miles further towards the northeast. I have also found it on Little Neck, on the western side of the island, the extent of its range thus covering a distance of some ten miles.

The young plants may be detected before the end of June (June 29, 1912, largest plants three inches high). In full flower and with mature fruit August 16, 1906; September 5, 1904; still in bloom September 21, 1909.

SABBATIA CAMPANULATA (L.) Torr.

S. gracilis Salisb.

Shores of Almanac Pond and in wet places, also under fresh water conditions, at one or more stations in Squam. Plants ten inches high June 25, 1910; at the same place only two to three

inches high July 11, 1912; still in flower September 19, 1907; no flowers remaining September 16, 1899.

In the herbarium of Columbia University is a specimen from Nantucket collected by T. A. Greene in 1827, which is doubtless the oldest existing specimen of any Nantucket plant. It is labeled in Dr. Gray's hand "*S. stellaris*, Torr. & Gray Fl. N. Am."

The species was first recorded from Nantucket by Professor Edward Hitchcock in his "Report," edition of 1833, under the name *Sabbatia stellaris* Pursh. It was again reported by Mr. Oakes in Hovey's Magazine for May, 1841 (7: 180) where it was referred to *Sabbatia campanulata* Torr. (*S. gracilis* Salisb.), having been again collected by Dr. James W. Robbins "in moist hollows in Squam, in Mr. Greene's locality, Sept., 1829." Dr. Gray, in Synoptical Flora, confirmed this determination of Oakes, referring to the Nantucket plant as *Sabbatia gracilis* Salisb., "an ambiguous form."

The Nantucket plant, while in many examples quite typical, is mostly reduced in size and little branched, with the leaves in many cases relatively short and broad, frequently, indeed, exactly oval throughout, or the lower ones ovate. Precisely similar forms are frequent on Long Island, where the perfectly typical plant is locally common. It is interesting to note that *Sabbatia stellaris* Pursh occurs on Martha's Vineyard.

The specific distinctness of *Sabbatia campanulata* (L.) Torr. from *S. stellaris* Pursh seems to be not well supported by the characters that have been mainly relied upon for its separation. No points of difference that are at all constant are to be found in the more or the less divided style, the longer or the shorter calyx lobes, the broader or the narrower leaves. Actually all of these differences are unstable in a very marked degree. Much less so are two other characters which, indeed, seem to be almost always sharply distinctive although they have been little emphasized in descriptions. In *S. stellaris* the main stem leaves, broadest at or above the middle, are distinctly narrowed to the base and the usually acute apex, and the entire plant, unless carefully pressed, readily turns black in drying. *Sabbatia campanulata*, on the contrary, shows little or no discoloration on the herbarium sheet, and the commonly obtuse leaves, linear, linear-oblong, oval or, low

on the stem, actually ovate, are broadly sessile or subclasping. It is also worthy of remark that the leaves of *S. campanulata*, although the more fleshy in life, become more membranous in the dried specimen and more distinctly reticulate-veined.

BARTONIA VIRGINICA (L.) BSP.

Bogs and low grounds, also on the dry plains towards the south shore. Plants three inches high June 29, 1912; in full flower August 6, 1906, continuing in bloom through September. The corolla is subject to a noteworthy degree of variation both in size and form, its lobes varying from either broadly or narrowly oblong to spatulate, from entire to denticulate, and from truncately obtuse to mucronulate, or even tapering acute; anthers yellow, mucronulate, about 1 mm. long; capsule 4–6 mm. long, 2–3 mm. wide, remaining united at the apex, and septicidal below the undivided stigma. In the two following species the capsule splits into more or less spreading valves.

There is a late season form of *Bartonia virginica* that differs strikingly in appearance from the commoner form of the plant especially in its earlier flowering stage; the broadened lobes of the corolla have become rose purple, sometimes of an actually bright shade nearly throughout, and the enlarged ovoid capsule, 2.5–3 mm. in diameter, has by its increased width dilated the stigma to a broadly pyramidal instead of the usual columnar form. In cold sphagnum bogs a very small and delicate few-flowered form is sometimes found in which the cauline bracts, and even the flowers, are alternate.

* BARTONIA PANICULATA (Michx.) Robinson.

Occasional or frequent in damp or wet shaded thickets, straying out into open bogs; locally common about the borders of Tom Never's Swamp. In full flower August 31, 1904, continuing in bloom through September. Corolla white, 3–4 mm. long, the lobes lanceolate and acuminate to ovate-oblong and acute; capsule ovoid, 3–4 mm. long.

* BARTONIA IODANDRA Robinson.

This little known plant described from Nova Scotia by Dr. B. L. Robinson, in 1898, proves to be also a plant of Nantucket, where it shows clearly the characters that Dr. Robinson has

pointed out and that would seem to give it adequate standing as a species. It is found also on Martha's Vineyard and apparently, also, on Long Island, not always, however, perfectly maintaining the characters of its typical form, and certain rather dubious examples undoubtedly raise the question whether it may not be intergradient with *Bartonia paniculata*. In certain of its forms having the pedicellate branches opposite or nearly so it has so much the aspect of *B. virginica* that it might easily be mistaken for that species, but it is always to be distinguished from it by much smaller anthers and distinctly two-lobed instead of entire stigma. In *B. virginica* the mucronulate anthers are 0.75–1 mm. long, and the stigma is closely united to the apex; in *B. iodandra* the obtuse anthers are only 0.5 mm. or less in length and the stigma is bifid or cleft into two evident or even divergent lobes. The anthers of *B. paniculata* are similar to those of *B. iodandra*, perhaps slightly larger, but the lobes of the stigma, in the specimens at hand, are more contiguous and the stigma itself thicker and more depressed. In its most distinct form *B. iodandra* is a smaller plant than *B. paniculata*, of stricter habit and simpler inflorescence, the pedicels shorter and straighter and frequently opposite or nearly so; it differs also by larger flowers (4–6 mm. long) and capsules that are oblong rather than ovoid and bear stigmas that are longer and more distinctly two-lobed. It is quite possible, however, that the form of the capsule and of the stigma varies considerably with the degree of maturity as is the case with *B. virginica*. The corolla is commonly of membranous texture, sometimes almost translucent, and a correlated thinness of tissue is seen in the calyx lobes which tend to spread or recurve at the tip. In *B. paniculata* there is usually little evidence of the purplish coloration that so readily invades the tissues of *B. iodandra*, coloring the stems and often, but not always, the mature corolla, and, in the anthers sometimes intensifying into a deep maroon shade. But this coloring is not a constant character. The anthers may be either clear yellow with purple filaments or deep purple with the filaments yellowish. In *B. paniculata* the filaments are often faintly purplish and, rarely, the anthers and even the corolla may show a perceptible purplish tinge.

MENYANTHACEAE

MENYANTHES TRIFOLIATA L.

Mrs. Owen's catalogue bears record that this plant was found in Maxcy's Pond in 1853. It has remained there to this day in a secluded corner of the pond where, in 1909, it spread over an area not less than thirty yards in greater extent. I know of it also at three other stations on the island: in Shawaukemmo meadow; in a wet bog on Little Neck, where there is much of it, and in Round O Swamp, a circular bog perhaps one hundred yards across, set in the open on the western side of the island. So abundant is it here that, in early June, before becoming hidden by taller growing plants, its crowded leaves overspread the swamp in one unbroken level of dark bluish green, made more striking to the eye by a wide encircling rim of golden green from the budding leafage of the investing shrubbery. Here on June 1, 1909, it appeared to have passed entirely out of bloom until my field glass revealed a few plants in the very middle of the swamp still in full flower. The following year three weeks later in the season it was completely screened from view by a taller growth of *Calamagrostis* and *Decodon*. Found at one station on Martha's Vineyard.

NYMPHOIDES LACUNOSUM (Vent.) Kuntze.

Lymnanthemum lacunosum Griseb.

In many of the fresh water ponds. Just in flower June 15, 1908, June 27, 1910; in full flower July 6, 1912, on the eastern side of the island, not yet quite in flower on the western side July 10. Occurs on Tuckernuck.

APOCYNACEAE

* VINCA MINOR L.

Sparingly escaped from cultivation in and near the town. In full flower June 4, 1911.

APOCYNUM ANDROSAEMIFOLIUM L.

Occurs sparingly on the eastern side of the island in Pocomo and Squam and near Siasconset. In full flower near Wawinet July 8, 1912. Corolla brightly pink tinged, the largest 6.5 mm. long, spreading 8 mm.

*APOCYNUM MEDIUM Greene.

This species, the most characteristic dogbane of Nantucket, is frequent about the borders of thickets or in open ground throughout the eastern side of the island from Monomoy to Squam and Siasconset and on the South Pasture. On the western side I have seen it only by the roadside near Maxcy's Pond. Leaves beginning to unfold June 2, 1909; just in flower June 29, 1912, and still in flower July 11. It exhibits pronounced variations, developing both narrow-leaved and broad-leaved forms, and varies from nearly glabrous to almost hoary pubescent. The leaves, sometimes as large as 11 cm. long and 6 cm. broad, are commonly ovate-oblong and acute, but vary from ovate to lanceolate and tapering acute, to broadly oval, elliptic or oblong and obtuse, and may be either narrowed, rounded or subcordate at the base and subsessile or on slender petioles 8 mm. long. The flowers are always more or less suffused with clear pink. In an unusually pubescent form the corollas were puberulent on the inner surface.

APOCYNUM CANNABINUM L.

Not uncommon on the eastern side of the island from Polpis to Pocomo and Squam. Just in flower July 4, 1912. Several rather distinct varieties occur. One, found in dry soil near Wawinet, has white, urceolate corollas 3–3.5 mm. long, the lobes shorter than the tube, their tips finally spreading. A taller variety with longer and narrower leaves on more slender petioles becoming 12 mm. long, has greenish to definitely yellow corollas 4 mm. long with erect lobes the length of the tube, the bluish green leaves glaucescent on the upper face; this grew luxuriantly about a low meadow thicket in Squam. In yet another form with short-lobed white corolla, the narrowly oblong leaves are very short-petioled or subsessile and slightly narrowed to a cordate base. In all of these forms the leaves are more or less pubescent beneath and the cyme quite glabrous to slightly pubescent.

*APOCYNUM PUBESCENS R. Br.

Occurs sparingly in Squam. Not quite in flower June 15, 1908. Inflorescence and leaves beneath densely white tomentose; the upper part of the stem and the younger leaves on the upper

surface hoary pubescent; leaves dark green above, mostly ovate to elliptic or oval, rounded at base, the petioles white tomentose.

* APOCYNUM SIBIRICUM Jacq. ?

Scattered along a thicket bordering the west side of Tom Never's Pond. Inflorescence just appearing June 24, 1910; first flowers July 2, 1912. Plants becoming at least 6 dm. tall, pale green and glaucous, glabrous throughout, even the unfolding leaves showing no trace of pubescence; leaves narrowly oblong to ovate-lanceolate, acute, becoming 14 cm. long, rounded at the base, short-petioled, or the lower subsessile and cordate; corolla small, creamy white, the short lobes obtuse; calyx-lobes elongated, linear-lanceolate, tapering and flexuous, ciliolate towards the end when young.

Referred to *A. sibiricum* in the broad sense in which the name seems to be commonly employed. It is scarcely possible to believe, however, that this Nantucket dogbane belongs to the same species as the diffuse small-leaved plant of gravelly river shores (*A. album* Greene), now merged with *A. sibiricum*, nor can it be referred without much reservation to typical *A. sibiricum* (*A. hypericifolium* Ait.), an erect, often tall glaucous species with cordate-clasping mostly oblong and obtuse leaves. It is quite possible that it may represent some one of a number of species recently announced by Professor Greene (Leaflets II: 169–174. 1912).

ASCLEPIADACEAE

ASCLEPIAS TUBEROSA L.

So far as known the butterfly weed has never been other than a rare plant on Nantucket, although it is locally common on Martha's Vineyard, and abundant on Chappaquiddick Island. The herbarium of the Maria Mitchell Association contains a flowering specimen collected near the old mill July 17, 1896, and one from the Friends Burying Ground, July, 1889. Here on June 19, 1908, grew a solitary tuft of eight stems all bearing clusters of flower buds. Of late years it seems to have been found nowhere else on Nantucket than at this station.

* ASCLEPIAS PURPURASCENS L.

Capaum Pond, July 10, 1912,—a group of eleven plants in full flower growing about midway on the face of the bluff or high

bank on the west side of the pond. Less than one hundred feet distant the bluff from top to bottom was clothed with a dense growth of the common milkweed, also in full bloom.

ASCLEPIAS PULCHRA Ehrh.

Common in low grounds. First open flowers July 10, 1912; in full flower August 15, 1906; no flowers left August 27, 1904. A number of plants were seen having some of the leaves in whorls of three and of four.

A well-marked variety of this milkweed is common on Nantucket, perhaps even more so than the ordinary form. It is characterized by denser white-tomentose pubescence, shorter internodes and much broader ovate to ovate-oblong, often cordate leaves, sometimes as much as 8 cm. in width.

ASCLEPIAS AMPLEXICAULIS J. E. Smith.

Not an abundant, but a characteristic plant of Nantucket widely scattered over the dry plains and commons. Umbels of close buds June 17, 1910; large flower buds June 30, 1912; first flowers July 9, 1912.

ASCLEPIAS EXALTATA (L.) Muhl.

Rare. A single small plant was found near Almanac Pond, September 21, 1907. The species was not seen again until July 8, 1912, when a cluster of tall plants in full flower was found in a hillside thicket in Squam near Eatfire.

ASCLEPIAS SYRIACA L.

Common, often forming large colonies in fields and along banks and roadsides. A few inches high May 30, 1909; flower buds appearing June 20, 1908; umbels of large buds June 15, 1910; first flowers June 27, 1910, June 29, 1912.

CONVOLVULACEAE

*IPOMEA PURPUREA (L.) Lam.

Occasional in waste places. In flower August 11, 1906, September 18, 1908.

* CONVOLVULUS SEPIUM L.

In a cultivated field near Miacomet Pond June 3, 1909. Not in flower, but unmistakably the introduced European plant.

Glabrous, leaves dark green, thickish, obtuse or broadly acute, the approximate basal lobes directed backward or even incurved, broad and rounded or obtusely angled. This European bindweed is said to intergrade with our native species. However this may be the two plants seem to follow independent trends of development that take them into a wide divergence. The flowers are even more at contrast than is the foliage. The commonly white corolla of the introduced species is of much thicker texture and of a different form than that of our native plant, the limb less expanded, the tube shorter and broader and more abruptly narrowed at its insertion; also the anthers are larger and their filaments broader basally and more abruptly narrowed above; the peduncles are more decidedly quadrangular, even wing-margined, and the bracts are larger, commonly clasping the corolla for more than half its length. I have usually found it a local and not at all a common plant.

CONVOLVULUS AMERICANUS (Sims) Greene.

In low thickets twining on the shrubbery, sometimes long trailing on gravelly or sandy shores. Nearly glabrous to slightly pubescent, the leaves attenuate or acuminate, the basal lobes divergent, entire or sharply angulate. Not always well defined from *C. repens* and apparently intergrading with it. Nevertheless the two plants when developed in their proper types are strikingly distinct.

* CONVOLVULUS REPENS L.

Very common, mainly along brackish shores and the borders of salt marshes. Just in flower June 15, 1908, June 15, 1910. Typically densely white pubescent or velvety throughout, the basal lobes of the leaves parallel and entire or nearly so.

CONVOLVULUS ARVENSIS L.

Occasional along fences in the town and suburbs; Quaise. Just in flower June 19, 1910, July 6, 1912.

CUSCUTA GRONOVII Willd.

Infrequent, but found here and there throughout the length of the island. The orange colored stems become noticeable by the middle of June and the flowers appear late in August and early in September.

A form collected in Polpis, September 17, 1907, growing on *Solidago* and *Boehmeria*, has diverging styles becoming 3–4 mm. in length, and stamens nearly as long as the lobes of the corolla; the scales of the corolla are parted and cleft into a sparse fringe and the depressed-subglobose capsule is not at all umbonate but, on the contrary, definitely flattened at the top.

BORAGINACEAE

* LAPPULA LAPPULA (L.) Karst.

Waste yard on North Water Street, June 17, 1910, a single large plant just in flower; Surfside, July 4, 1912, a number of plants in full flower about an abandoned chicken paddock.

* AMSINCKIA INTERMEDIA F. & M.

A number of plants in scattered growth with the preceding near Surfside, in full flower and fruit July 4, 1912. Plants erect, becoming 6 dm. high with flowering spikes 2 dm. long; corolla 1.25 cm. long, spreading 7 mm., orange yellow, reddened in the throat.

PNEUMARIA MARITIMA (L.) Hill.

Although the sea lungwort has long been known to grow on Nantucket, reaching there the southern limit of its range, it seems to have remained always one of the island's rarer plants and never to have established any permanent colony. Nor is it known that more than a few plants have ever been found together on the island. It seems to appear sporadically, and to disappear, at widely separated points along those miles of seashore that, it might be thought, would offer good encouragement to its continued growth. These circumstances of its occurrence suggest that its seeds may come to the island from time to time by some natural agency of dispersion but that the plant is unable to overcome some condition in the environment not quite favorable to its particular needs. Mrs. Owen has recorded the occurrence of a single plant on the north shore at Brant Point, one or two on the south shore, and a few large plants on the southeast shore between Siasconset and Sancoty. I, myself, have met with it only twice; on the sand strip between Sachacha Pond and the ocean, two small sterile plants, September 6, 1904; and at Coskaty, a solitary plant in full flower, June 12, 1911.

* MYOSOTIS SCORPIOIDES L.

Myosotis palustris Lam.

Established by the roadside along a rill flowing from the fountain erected in 1900 in memory of the mother of Benjamin Franklin, who was born near this now uninhabited spot 233 years before. It was found there by Mr. Floyd in 1906, and by me September 14, 1907, when in some of the plants young racemes were concealed within the terminal leaves. First flowers June 6, 1909; in full bloom June 10, 1908, and June 7, 1910; a few flowers remaining June 28, 1912. Doubtless, it may be supposed, the forget-me-not had been planted at this memorial fountain, perhaps at the time of its dedication, but I was unable to ascertain that this was known to have been its origin there.

* MYOSOTIS ARVENSIS (L.) Hill.

A few plants were found by Mrs. Flynn in a field by Orange Street in 1895. A specimen sent to me had been collected June 29, and bore both flowers and fruit.

* LITHOSPERMUM ARVENSE L.

A few plants in a waste yard on North Water Street in full flower and fruit June 17, 1910. A single plant in full flower was collected the same year by Miss Grace B. Gardner by a sandy roadside south of the town.

ONOSMODIUM VIRGINIANUM (L.) DC.

Not at all a rare plant on Nantucket, as has been supposed, but confined to the northeastern quarter of the island where it is locally common in dry open ground through Squam, extending into Pocomo; farther west two plants have persisted for several years on a dry knoll near Acquidness Point. It is also locally common on Chappaquiddick Island, Martha's Vineyard. Many unopened flower buds June 12, 1909; first flowers June 15, 1908; in full flower June 20, 1910; July 11, 1912.

* SYMPHYTUM ASPERRIMUM Donn.

Meadow near the Springfield House 1895 and 1906, F. G. Floyd. The antecedent of this station is perhaps a group of plants that has survived for years in a neglected yard not far away on North Water Street where it would appear to have been originally planted. Freshly in flower June 15, 1910.

ECHIUM VULGARE L.

Established along Orange Street in the eastern outskirts of the town. The plants have been numerous in some years, scarce in others, and have spread little since they were first seen in 1904. Mrs. Owen has recorded that a few plants were found near Siasconset in 1887. First flowers June 19, 1910; in full flower June 28, 1910; August 5, 1906; September 11, 1907.

VERBENACEAE

VERBENA HASTATA L.

In low grounds; frequent throughout the northern half of the island where it is rather common in parts of Polpis and in Squam. Plants six inches high June 11, 1909; first flowers July 10, 1912; still in full flower September 11, 1907. The Nantucket plant is mainly the form having leaves cleft on each side near the base.

* VERBENA URTICIFOLIA L.

Barnyard, 1896, Mrs. Mabel P. Robinson, fide F. G. Floyd. Doubtless introduced. Occurs sparingly on Martha's Vineyard.

LABIATAE

TEUCRIUM LITTORALE Bicknell.

Common along salt and brackish meadows and by pond shores. Plants very small May 30, 1909; not yet any flower buds July 14, 1912; in full flower August 16, 1906.

A dense growth of this species that covered a pile of stones by a fieldside in Polpis, wholly away from the influence of salt water, consisted entirely of plants bearing pure white flowers.

* TEUCRIUM OCCIDENTALE A. Gray.

A cluster of plants not yet out of bloom was found growing in a lumber yard on the wharves September 5, 1904. The species was found again on Nantucket, August 1, 1910, by Miss Grace B. Gardner, who has sent me a specimen in full flower collected in waste ground on Silver Street near Milk Street.

TRICHOSTEMA DICHOTOMUM L.

Common in sandy soil, and often abundant in old fields. It blooms in August and through September.

SCUTELLARIA LATERIFLORA L.

Frequent or rather common in wet places. In full flower September 6, 1904.

SCUTELLARIA GALERICULATA L.

Common in boggy places and along pond shores. First flowers June 22, 1910; in full flower June 28, 1912, and in early September, 1904; no flowers left September 11, 1907.

MARRUBIUM VULGARE L.

Occasional by street sides and in waste places; abundant in the jail yard; Monomoy farm; one cluster at Madequecham Pond. In full flower June 16, 1908, June 16, 1910.

NEPETA CATARIA L.

The familiar catnip may be seen in cultivation in old Nantucket gardens, but is rather scarce as a wild plant. It springs up as a casual weed in the town and is found sparingly in waste places and farmyards in the suburbs; seen at one farmyard in Madequet. At one spot in Pocomo it grew in abundance far from any dwelling but where evidently a small house had stood many years before. No flower buds up to June 15, 1908; not yet in flower June 29, 1912; in full flower July 10, 1912, and through September.

GLECOMA HEDERACEA L.

Established at a few places in the town and suburbs. In full flower June 7, 1908, June 9, 1911.

* PRUNELLA VULGARIS L.

Occasional on lawns in the town; evidently introduced, probably with grass seed.

PRUNELLA PENNSYLVANICA Willd.

Meadows, fields and roadsides. I have never anywhere seen it more abundant or more brightly conspicuous when at its height of bloom. First flowers June 7, 1908, June 9, 1909, June 9, 1911, June 16, 1910; still in bloom late in September.

GALEOPSIS LADANUM L.

This hemp nettle is noted from Squam in Mrs. Owen's catalogue, wherein also the name *Galeopsis Tetrahit* L. appears, but without mention of any locality. Nothing further is known of either species as a Nantucket plant.

LEONURUS CARDIACA L.

Frequent or rather common in barnyards and waste spots, especially in and near the town; Quaise, Pocomo; Madequet. No flowers up to June 21, 1908; freshly in bloom June 28, 1912; past flowering September, 1907.

LAMIUM AMPLEXICAULE L.

An occasional weed in town gardens and sometimes abundant in once cultivated fields in the suburbs; Shawkemo; Quaise. In full flower May 30, 1908; June 3, 1911; June 15, 1910; small closed flowers September 13, 1909.

STACHYS HYSSOPIFOLIA Michx.

Wigwam Pond in Saul's Hills. In full flower August 6, 1906, thriving in water up to six inches in depth, smaller and of less vigorous growth along the shore. I have not myself seen it elsewhere on Nantucket although Mrs. Owen speaks of it as rather common by some of the Polpis ponds. The plant is the typical narrow-leaved form.

* SALVIA OFFICINALIS L.

A single tall plant, nearly past flowering, growing among weeds and briers on Sunset Hill, June 27, 1912.

HEDEOMA PULEGIOIDES (L.) Pers.

Nothing is known of the pennyroyal on Nantucket beyond its inclusion in Mrs. Owen's catalogue. There is not the least improbability in the record, but if the plant grows on the island today it must be extremely rare. It occurs locally on Martha's Vineyard.

* MELISSA OFFICINALIS L.

A few plants in a neglected grassy yard on North Water Street June 11, 1911, July 7, 1912. Miss Grace B. Gardner writes me that she has also collected this plant on Nantucket.

KOELLIA FLEXUOSA (Walt.) MacM.

Occurs very sparingly in Squam and also at a station less than a mile east of the town, where it was first found September 15, 1899, then in full flower. Here it grew thickly among the rank vegetation about a small pool.

In the first edition of Gray's manual this species is reported

from Nantucket, the northern limit of its then known range. Mrs. Owen remarks of this in her catalogue that the Nantucket locality is unknown and that the plant had never been "found by collectors of the present day." Quite possibly the station east of the town had been discovered by some botanist over half a century ago and was the basis of Dr. Gray's record.

KOELLIA VIRGINIANA (L.) MacM.

Frequent in Squam, at scattered stations, extending towards Pocomo and south to Sachacha Pond, also sparingly near Siasconset. Nearly in bloom July 8, 1912; still in flower September 16, 1899; no flowers left September 21, 1907.

KOELLIA MUTICA (Michx.) Britton.

Frequent at the eastern end of the island, in Squam, and in "The Woods" on the western side; it is also found near the middle of the island about the head of Miacomet Pond. First flowers July 8, 1912; in full flower in August and as late as the middle of September.

The *Pycnanthemum incanum* Michx. of Mrs. Owen's catalogue doubtless refers to this species.

* KOELLIA VERTICILLATA (Michx.) Kuntze.

Found sparingly at several stations in Squam, near Wauwinet growing with *Koellia virginiana*. First flowers July 8, 1912. The Nantucket plant is distinctively *Koellia verticillata* as set apart from the more southern *Koellia Torreyi* (Benth.) Kuntze. Its lanceolate leaves vary from entire to serrate with few but distinct cartilaginous-tipped teeth, and the uppermost leaves, with the floral bracts, are canescent. It seems to be always closely associated in growth with *K. virginiana* in a part of the island inhabited also by *K. mutica*, and its aspect and characters appear to be so obviously intermediate between these two plants, tending now towards the one and now towards the other, that its status as an independent species, at least on Nantucket, assuredly becomes open to question.

* THYMUS SERPYLLUM L.

Collected on Nantucket in August, 1906, by Miss Mina K. Goddard. A specimen in flower and fruit was kindly sent to me for examination by Mrs. Flynn.

LYCOPUS UNIFLORUS Michx.?

Lycopus communis Bicknell.

Common in low grounds. Plants very small May 30, 1908, June 3, 1911; in full flower August 16, 1906, September 12, 1907. A distinct appearing form, observed especially at Maxcy's Pond and Capaum Pond, becomes much branched from a woody non-tuberous base and produces numerous slender and widely branched tuber-bearing purple stolons, sometimes three feet in length. The dark green divergent leaves, sharp serrate and acuminate, are numerous and brought close together by the very short internodes, and the uppermost are usually strongly purplish tinged; the sepals are narrower and more acute than in the typical plant, sometimes even narrowly lanceolate, suggesting those of *Lycopus rubellus* Moench. This plant bears a strong resemblance to forms of *Lycopus virginicus* L. and seems to approach it in some of its characters, but the corolla is dilated in the throat and has widely spreading lobes like that of the common species, of which it appears to be an extreme phase. The same form is found on Martha's Vineyard and on Long Island.

* LYCOPUS MEMBRANACEUS Bicknell.

Lycopus uniflorus Michx.?

Uncommon, occurring in damp or wet shaded thickets. Polpis, August 6, 1906, in full flower; Quaise, September 11, 1907, growing with the dwarf cornel; Pocomo, September 21, 1907, some late flowers.

Slender, often lax or decumbent, leaves very thin, cuneate-ovate, or narrower, often rhomboid, saliently coarse toothed, usually obtusely long-pointed; petioles slender, two or three times longer than the flower clusters; clusters looser and fewer flowered than in the preceding, the mature flowers distinctly pedicelled; calyx-lobes membranous, often very pale or whitened, commonly deltoid, obtuse or acute; the sinuses rounded; fruit pale in color when mature.

Remarkably distinct in appearance from the preceding species yet quite possibly intergrading with it. The ordinary shade form of the latter is, however, a plant not at all like *Lycopus membranaceus*. It is larger, stouter and of more luxuriant growth, with the internodes shorter and the more numerous leaves of thicker texture

and short-petioled or sessile; they are furthermore more oblong or ovate-oblong in general form, much less cuneately tapering at base, the teeth much less pronounced and, with the apex of the leaf, more acute; the flowers are much more numerous and shorter pedicelled and are formed into compact or globose clusters.

* LYCOPUS SESSILIFLORUS A. Gray.

A characteristic plant of Nantucket, growing in muddy wet places and about bog holes in all parts of the island. Young plants recognizable May 30, 1908; in full flower and fruiting well September 5, 1904; still in full flower September 21, 1909.

LYCOPUS AMERICANUS Muhl.

Common in low grounds and along Pond shores. Plants very small May 30, 1908; just in flower July 10, 1911; still in bloom September 12, 1904.

MENTHA SPICATA L.

Scarce; streetside near the wharves and at two stations in the suburbs of the town, also in a meadow in Madequet. Not seen in flower.

* MENTHA PIPERITA L.

Scarce; along Crooked Lane and at three other stations west of the town. Not seen in flower.

* MENTHA GENTILIS L.

Sparingly in waste ground west of the town September 20, 1899, last flowers; border of meadow at Consue spring July 10, 1912—a large form, the leaves conspicuously whitened along the veins, no signs of flowering.

* MENTHA CANADENSIS L.

Frequent or rather common in low grounds, often developing an unusual degree of somewhat villous white pubescence. Plants a few inches high June 4, 1909; in full flower at the end of August, 1904, and as late as September 18, 1899.

* MENTHA ROTUNDIFOLIA (L.) Huds.

Through the kindness of Mrs. Flynn, I have been enabled to examine a mounted specimen of this mint collected in full flower on Nantucket, August 19, 1895, by Miss Mina K. Goddard. The

leaves, which are short-petioled and low crenate-serrate, are thinner and less rugose and pubescent than in more characteristic examples of this variable mint; the spikes however are quite typically narrow, and interrupted below.

* MENTHA CRISPA L.

Found by Mrs. Flynn growing in quantity along a ditch near the harbor east of Union Street. Specimens sent to me were collected in full flower in August, 1895, and are perfectly typical. Apparently not previously reported from Massachusetts.

INDEX TO AMERICAN BOTANICAL LITERATURE

1906–1914

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in the broadest sense.

Reviews, and papers that relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omissions, their kindness will be appreciated.

This Index is reprinted monthly on cards, and furnished in this form to subscribers at the rate of one cent for each card. Selections of cards are not permitted; each subscriber must take all cards published during the term of his subscription. Correspondence relating to the card issue should be addressed to the Treasurer of the Torrey Botanical Club.

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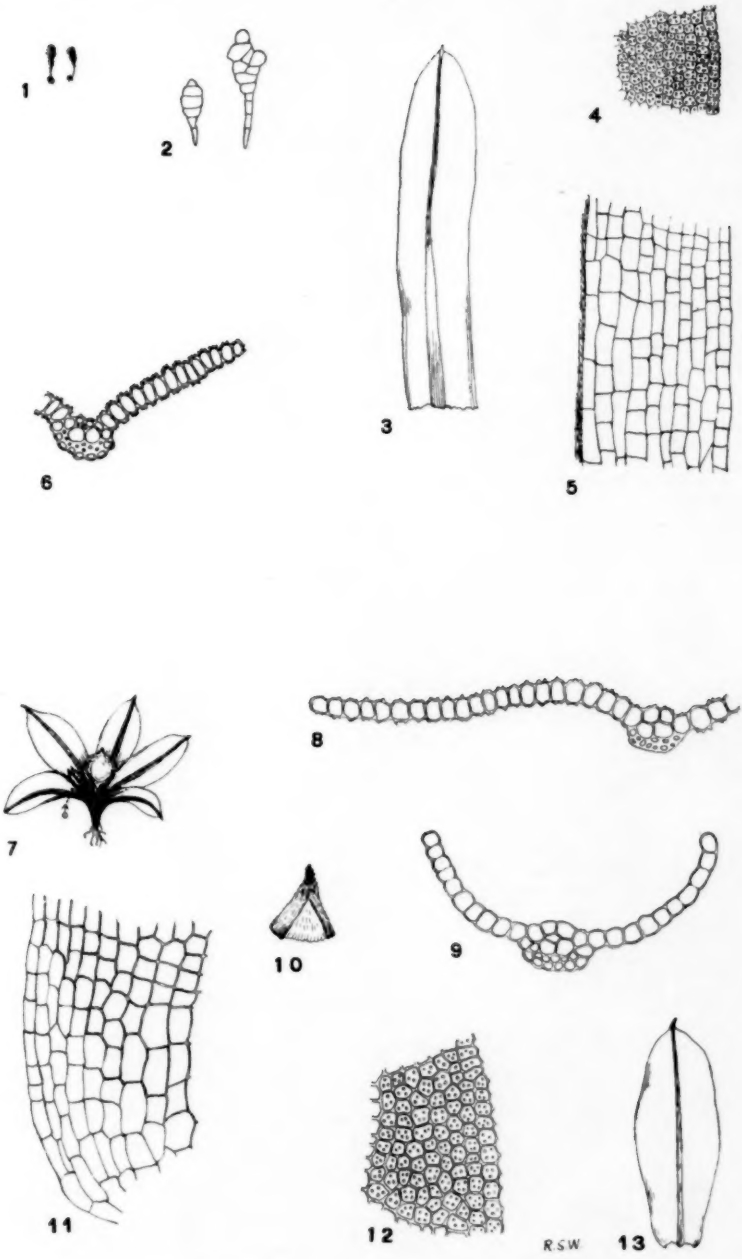

1–6. HYOPHILA ULIGINOSA E. G. BRITTON
7–13. PHASCUM SESSILE E. G. BRITTON